

<b>Office Action Summary</b>	<b>Application No.</b> 10/531,129	<b>Applicant(s)</b> GUTSOL ET AL.	
	<b>Examiner</b> Ngoc-Yen M. Nguyen	<b>Art Unit</b> 1734	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 January 2011.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5,7-9 and 13-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5,7-9 and 13-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

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|--|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                                  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____   |

### **DETAILED ACTION**

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 11, 2011 has been entered.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 8 and 18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

There is no sufficient support for the "about 4140 ppm" as required in the instant claims 8 and 18. It is noted that the total VOC concentration for "worst case scenario" in Table I is 4139 ppm; however, the claimed "about 4140" includes other values, such as 4135 or 4145, that are not disclosed in Table I.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-5, 7-9, 13-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, there is no antecedent basis for 'the insoluble volatile organic compounds'.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5, 7-9, 13-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sobacchi et al, "Experimental assessment of non-thermal plasma techniques for removal of paper industry VOC emissions", 15<sup>th</sup> International Symposium on Plasma Chemistry, Orleans, July 9-13, 2001. Symposium Proceedings, Vol. VII: poster contributions, pp. 3135-3140) (taken from <http://plasma.mem.drexel.edu/publications/>), optionally further in view of Makin '675.

It should be noted that the Sobacchi is available as a reference under 35 USC, 102(b) for claims that do not entitle to the early filing date of the provisional application 60/367,231 and under 35 USC 102 (a) for claims that have full support in the provision

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application (it should be noted that the inventive entity of the instant application is different than the authors of the Sobacchi reference).

The following limitations are *examples* of limitations that do not have support in the provisional application:

- “0.1 to about 1 kHz” in claim 3;
- “about 60 to about 6000 ppm VOC” in claims 4 and 17;
- “ about 40°C to about 65°C” in claim 7;
- “about 4140 ppm VOC” in claims 8 and 18;

Sobacchi discloses a process using non-thermal plasma techniques for treating of volatile organic compounds (VOCs) emissions from the paper industry (note abstract). The gas compositions are listed in Table 1. Dimethyl sulfide and  $\alpha$ -pinene are considered as insoluble VOCs. The amounts of VOCs listed in Table 1 overlaps the claimed ranges. With respect to the encompassing and overlapping ranges previously discussed, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time of invention to select the portion of the prior art's range which is within the range of the applicants' claims because it has been held prima facie case of obviousness to select a value in a known range by optimization for the results. *In re Boesch*, 205 USPQ 215. Additionally, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time invention was made to have selected the overlapping portion of the range disclosed by the reference because overlapping ranges have been held to be a prima facie case of obviousness. *In re Malagari*, 182 USPQ 549.

In the experiments, pulse frequency was varied between 266 Hz and 1450 Hz (0.266 to 1.45 kHz). A water flow rate equal to 0.25 ml/min was provided and the gas flow rate was 2 SLM (note third page of the article, first full paragraph).

In Sobacchi, when the VOCs include insoluble volatile organic compounds such as dimethyl sulfide and pinene, such compounds would inherently be partially oxidized when subjected to the similar pulsed corona discharges.

The temperature can be from 70-200°C (note page 4 of the article, last paragraph). The target objective of 99% removal can be reached (note page 3 of the article, second full paragraph).

Sobacchi discloses that corona discharge allows for achieving high values of Destruction and Removal Efficiency (DRE), with much lower power consumption (note last page of the article, first full paragraph).

The ratio of the water spray to the exhaust gas flow is  $0.25/2 = 0.125$  ml/min. This value is very close to the claimed value of “about 0.2 ml/min”, therefore, no patentable difference is seen. Furthermore, the value of “0.125” would have suggested to one of ordinary skill in the art a slightly higher value based upon a reasonable expectation of success, *In re O’Farrell*, 853 F.2d 894, 904, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988).

Furthermore, Sobacchi fairly suggests to one of ordinary skill in the art that there may be a synergetic effect of plasma chemistry and absorption into water on the VOCs removal (note page 2, last sentence of the first full paragraph).

It would have been obvious to one of ordinary skill in the art to optimize the process conditions in Sobacchi, such as water flow rate, temperature, pulse frequency, etc. to obtain the highest removal rate at lowest power consumption.

Optionally, Makin '675 can be applied to teach that methanol vapor, i.e. methanol in a gaseous stream, can be removed by scrubbing with water (note column 2, lines 31-34).

It would have been obvious to use optimize the flow rate of the water spray in the process of Sobacchi to remove methanol, as suggested by Makin '675 because the amount of water film would facilitate the removal of methanol as suggested by Makin '675.

Applicant's arguments filed January 11, 2011 have been fully considered but they are not persuasive.

Applicants argue that claim 1 is now fully supported by the provisional application and Sobacchi is no longer available as 102(b) prior art.

Sobacchi is still at least available as 102(a) prior art because the inventive entity is still different from the authors of Sobacchi.

Applicants argue that at 220°C, the injected water would not and could not exist in a liquid water spray or film.

It should be noted that the disclosure of Sobacchi is not limited to just the 220°C as mentioned in the first full paragraph on page 3 (note "temperature was kept equal to 220°C for this series of tests"). Sobacchi fairly teaches that the temperature for the

process can be 25-220°C (note Table on page 3, last column and last row). The temperature can be at, for example, 70°C (note last full paragraph on page 3 and Table on page 5. When lower temperature is used, the water in the process of Sobacchi would be present in the process in the form of a liquid.

Applicants argue that as described in the Experimental section, while liquid flows of water and VOCs are metered into the Sobacchi system, they are fully evaporated and mixed "in a stainless steel pre-mixing chamber, heated to 160°C and filled with glass beads".

The procedure as discussed in the second full paragraph on page 2 is to simulate "typical VOC compositions of these streams", the water that was evaporated is to simulate the humidity in the streams, and this evaporated water does not appear to be the same as the water flow rate mentioned in the first paragraph on page 3.

Applicants argue that even though Sobacchi discloses that the "corona and gliding plasma arc reactors were designed to allow water injection, in order to study a synergetic effect of plasma chemistry and absorption into water on the VOC removal", the authors present no data to confirm that any experiments were actually carried out to take advantage of these capabilities or any advantage in removing insoluble VOCs might be realized by the presence and use of liquid water.

Even if there was no actual experiment in Sobacchi to determine if there is a "synergetic effect" or not; however, it would have been obvious to one skilled in the art to carry out the any necessarily tests to either confirm or refute the statement.

Furthermore, Makin '675 can be applied as stated above to teach that the presence of water, i.e. water scrubbing, can help remove methanol.

Applicants argue that Applicants' claim 1 captures the removal of insoluble VOCs, whereas methanol is characterized as a soluble VOC.

It should be noted in Sobacchi, methanol is present in the streams to be treated and the process of Sobacchi removes methanol as well as any other VOCs (including insoluble VOCs) from the streams (note Table on page 5). Thus, it would have been obvious to one skilled in the art to use water scrubbing, as suggested by Makin, in the process of Sobacchi to promote the removal of methanol. It should be noted in Applicants' process, the insoluble VOCs are not removed by the water, but they are oxidized or converted into oxidation products that being removed by water.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoc-Yen M. Nguyen whose telephone number is (571) 272-1356. The examiner can normally be reached on Part time schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Emily Le can be reached on (571) 272-0903. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ngoc-Yen M. Nguyen/  
Primary Examiner, Art Unit 1734

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April 4, 2011